



US009409895B2

(12) **United States Patent**
Legrand et al.(10) **Patent No.:** US 9,409,895 B2
(45) **Date of Patent:** Aug. 9, 2016(54) **AUTOTAXIN INHIBITORS**(71) Applicants: **Darren Mark Legrand**, East Grinstead (GB); **Vikki Furminger**, Horsham (GB); **Christopher Thomson**, Horsham (GB); **Owen Rhys Hughes**, Derbyshire (GB); **Emily Stanley**, Horsham (GB)(72) Inventors: **Darren Mark Legrand**, East Grinstead (GB); **Vikki Furminger**, Horsham (GB); **Christopher Thomson**, Horsham (GB); **Owen Rhys Hughes**, Derbyshire (GB); **Emily Stanley**, Horsham (GB)(73) Assignee: **Novartis AG**, Basel (CH)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 42 days.

(21) Appl. No.: **13/833,460**(22) Filed: **Mar. 15, 2013**(65) **Prior Publication Data**

US 2014/0171403 A1 Jun. 19, 2014

Related U.S. Application Data

(60) Provisional application No. 61/739,214, filed on Dec. 19, 2012.

(51) **Int. Cl.**

C07D 249/08 (2006.01)
C07D 401/12 (2006.01)
C07D 403/12 (2006.01)
C07D 413/12 (2006.01)
A61K 31/4192 (2006.01)
A61K 31/454 (2006.01)
A61K 31/55 (2006.01)
C07D 211/34 (2006.01)
C07D 295/185 (2006.01)
A61K 31/337 (2006.01)
A61K 31/4174 (2006.01)
A61K 31/4245 (2006.01)
A61K 31/426 (2006.01)

(52) **U.S. Cl.**

CPC **C07D 413/12** (2013.01); **A61K 31/337** (2013.01); **A61K 31/4174** (2013.01); **A61K 31/4192** (2013.01); **A61K 31/426** (2013.01);
A61K 31/4245 (2013.01); **A61K 31/454** (2013.01); **A61K 31/55** (2013.01); **C07D 211/34** (2013.01); **C07D 295/185** (2013.01);
C07D 401/12 (2013.01); **C07D 403/12** (2013.01); **C07D 249/08** (2013.01)

(58) **Field of Classification Search**CPC .. C07D 401/12; C07D 403/12; C07D 413/12;
C07D 249/08

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,547,978 A 8/1996 Christensen et al.
6,159,938 A 12/2000 Gyorkos et al.
2004/0224901 A1 11/2004 Chaturvedula et al.

FOREIGN PATENT DOCUMENTS

EP 093379 A2 11/1983
EP 1564213 8/2005
EP 1698626 9/2006
EP 1340757 10/2006
WO 00/09542 2/2000
WO 02/080928 10/2002
WO 02/100352 12/2002
WO 03024946 A2 * 3/2003
WO 2004/098589 11/2004
WO 2005/016883 2/2005
WO 2006/077419 7/2006
WO 2006/134318 12/2006
WO 2007/003962 1/2007
WO 2007/020194 2/2007
WO 2007/061862 5/2007
WO 2007/103719 9/2007
WO 2009/046804 A1 4/2009
WO 2009/046841 A2 4/2009
WO 2009/080226 7/2009
WO 2010/060532 A1 6/2010
WO 2010/063352 6/2010
WO 2010/097374 A1 9/2010
WO 2010/112116 A1 10/2010
WO 2010/112124 10/2010
WO 2010/115491 A2 10/2010
WO 2011/006569 1/2011
WO 2011/044978 A1 4/2011
WO 2011/116867 A1 9/2011
WO 2012/024620 A2 2/2012
WO 2012/068589 A2 5/2012
WO 2013/186159 A1 12/2013
WO 2014/048865 4/2014

OTHER PUBLICATIONS

Fulp et al., J. of Med. Chem., 55(6):2820-2834 (2012).
Brotherton-Pleiss, Bioorg. Med. Chem. Letters, 20(3):1031-1036 (2010).
McMasters et al., Bioorg. Med. Chem. Letters, 19(11):2965-2968 (2009).
Tsutsumi et al., J. Med. Chem., 37(21):3492-3502 (1994).
Tsutsumi et al., Bioorg. Med. Chem. Letters, 4(6):831-834 (1994).
Adang et al., Bioorganic Medicinal Chemistry Letters, 9(9):1227-1232 (1999).
Zheng et al., Tetrahedron Letters, 47(44):7793-7796 (2006).
Timmons et al., Bioorganic Medicinal Chemistry Letters, 18(6):2109-2113 (2008).
Whitby et al., Journal of the American Chemical Society, 133(26):10184-10194 (2011).

* cited by examiner

Primary Examiner — Samira Jean-Louis

(74) Attorney, Agent, or Firm — Shawn D. Britt

(57) **ABSTRACT**

The present invention relates to novel compounds that are autotaxin inhibitors, processes for their preparation, pharmaceutical compositions and medicaments containing them and to their use in diseases and disorders mediated by autotaxin.

11 Claims, No Drawings